in *Perdita* the maxillary blade far exceeds the palpus, while the reverse is true in *Nomioides*. If *Perdita* is related to *Nomioides*, as suggested, we have a remarkable illustration of the persistence of colour-patterns in the face of great structural changes; and as the different colour-types of *Nomioides* can hardly have given rise separately to similar types of *Perdita*, we have also an illustration of kaleidoscopic variation, the characters combining in various ways and sorting out again, no doubt according to Mendelian principles. A strong argument against the suggested relationship may be based on the facial foveæ of *Perdita*—certainly an Andrenoid character.

XXVII.—*Notes on the Cocoons and Descriptions of Four new Species of the Genus* Trichostibas. By Embrik Strand, of the Royal Berlin Zoological Museum.

In his interesting paper on the genus *Trichostibas* (Proc. U.S. Nat. Mus. vol. xxxviii. no. 1765, October 15, 1910) Mr. August Busck describes, besides new species, also the cocoons, referring to the previous accounts of these. I should, however, like to point out that more and older accounts of these cocoons exist in the literature, viz., in Bates, 'Naturalist on the Amazons,' and in Blanchard, 'Metamorphoses, Mœurs et Instinctes des Insectes,' 2e édit. 1877. Bates figures and describes (*l. c.* p. 379 of the German edition: Leipzig, Dyk'sche Buchhandlung, 1866) the cocoon and gives also a most interesting account of the manner in which the larva manages to construct the network of the cocoon. Bates gives his insect no name, but regards it as belonging to the Lithosiidæ, which is easily explained through the great similitude of the moths of the genus *Trichostibas* to the Lithosiidæ; owing to this similitude, Walsingham points out (Proc. Zool. Soc. London, 1897, p. 115) that if Walker described the specimens of *Trichostibas fumosa* Z., which probably are in the British Museum, "he would be most likely to locate the species in the Lithosiadæ." Blanchard gives (*l. c.* p. 298) a figure of the cocoon, which he ascribes to an "Alucita du Brésil."

In the Royal Berlin Zoological Museum are several cocoons of this kind, most of them belonging to the former Staudinger Collection, now in the possession of the Museum. A few remarks on these may not be without interest, as they differ

not only in the colour, as pointed out by previous authors, but also in the shape, the network, &c.

In the ancient collection of the Museum is one cocoon from Caracas (*Gollmer* leg.) and one from Cuba (*Gundlach* leg.), both, I am sorry to say, without the insects. The former is 15 mm. long and 8 mm. broad, the supporting thread is only 7 mm. long, but has probably been torn off; the colour black. The latter cocoon is 12 × 6 mm., the thread ca. 50 mm., the colour white. In the Staudinger Collection are three bright salmon-red or orange-coloured cocoons from the Upper Amazons—Fonteboa, S. Paulo, and Pebas, the first two with the insects bred from them (*Trichostibas fonteboæ* sp. n., and *sancti-paulensis* sp. n.)—and a white one from Merida. The latter differs from the one from Cuba inasmuch as the network is more fine-meshed; the supporting thread is only 4 mm. long and at the end strongly enlarged in the form of a plate, which is 2·5 mm. wide; I am not sure, however, if this thread is entire. The species described below as *Trichostibas merida* sp. n. belongs probably to this cocoon. The supporting thread of the orange-coloured cocoons bears fine, perpendicularly offstanding fibrils, which are hardly to be seen with the naked eye, and are as long as the diameter of the thread. Owing to these fibrils the thread has a rough appearance and easily clings to other objects. The thread of the cocoon from Pebas bears, moreover, long, fine, woolly-looking fibres, which are mostly parallelly directed. The white cocoon from Merida and the black one from Caracas have no such perpendicular fibrils at all; the orange ones, on the contrary, bear such ones also on the heavier parallel threads of the network, but none on the thinner cross-threads; woolly-looking fibres are never to be seen on the cocoons themselves. The supporting thread is never fastened on the inner side of the wall of the cocoon, but often distinctly on the outer side. The cocoon from S. Paulo is especially interesting, owing to the fact that the meshes are filled up with a tissue of fine fibres, so that now but little of the original network is to be seen; this cocoon is also more cylindriform than the others, 25 by 11 mm., the thread ca. 160 mm. long, while the thread of the cocoon from Fonteboa is only 65 mm. The meshes form mostly an elongate parallelogram, but those of the black cocoon from Caracas are pentagonal or hexagonal; it measures 15 by 9 mm. The opening at the upper end of the cocoon is apparently made, or at least widened, when the moth issues; the network around the opening is often denser than in the middle of the cocoon. Blanchard says (*l. c.*) that the cocoons may

be "d'une jolie couleur violette"; it appears from his figure that he has seen the perpendicular fibrils.

I now give descriptions of three of the moths belonging (or, in one case, probably belonging) to the said cocoons and of one more, to which no biological information at all is appended.

1. *Trichostibas merida* Strand sp. n.

2 ♀ ♀ and 2 ♂ ♂ from Merida (*Hahnel* leg.).

Related to *Tr. fumosa* Z., but the male has no "aus ockergelben, kurzen, gedrängten Haarschuppen gebildeten Fleck" on the underside of the primaries, the markings differ (also from those of the likewise nearly related *Tr. imitans*, F. et Rgh.), &c.

♀. Labial palpi, face, head, and antennæ black with indistinct violet sheen; abdomen brownish black, with at least at the end of the upperside a little violet sheen. Thorax with patagia greyish black. Primaries dark brown, with cupreous-violet sheen and with dirty greyish-white markings, as follows: across the wing at the end of the basal third are three longish spots—an upper, which is distant from the costal edge about the length of the shortest diameter; a lower, which is a little more remote from the dorsal edge than the upper is from the costal edge; further a twice as long central spot: just beyond the middle of the wing is a broad band, broken up in two or more spots, an upper, longish oval one touching the costal edge, and a middle in and at the end of the cell, which two spots at the inner end almost unite, but towards the margin distinctly diverge; the middle spot unites with a dirty greyish-white cloud, which extends along the dorsal edge and perhaps sometimes appears as a distinct third spot. Along the outer margin is a band in the middle widening so as to form a tooth, that almost unites with the middle spot of the submedian band. The veins partly dark brown. The edge of the wing as well as the cilia like the ground-colour. Underside of the primaries dark brown, without the sheen or the spots of the upperside. Secondaries rather transparent on the basal half, opaque, blackish on the distal, especially at the apex. Underside more uniformly dusky than the upperside, but nevertheless lighter than the underside of the primaries. Cilia as dark as on the primaries. Ovipositor about 2–3 mm. protruding, brownish. Alar expanse 32·5 mm., alar length 16 mm., length of the body (without ovipositor) 12 mm.

♂ differs from the ♀ in being smaller (alar expanse

27 mm.; length of the wing 13, of the body 11 mm.); the primaries are in the dorsal half of the basal area partly lead-coloured; the face and vertex of one of my specimens greyish, of the other dark-coloured (perhaps the former is the natural colour, as the latter specimen appears to be somewhat greasy).

Most probably the described cocoon from Merida belongs to this species.

2. *Trichostibas sanctipaulensis* Strand sp. n.

1 ♀ from S. Paulo, Upper Amazonas (*Hahnel* leg.). Cocoon, *vide supra*.

Is one of the largest of the known *Trichostibas*: alar expanse 36 mm.; length of the wing 16·5, of the body 15 mm.; and accordingly almost as large as *Tr. isthmiella* Busck, to which our species appears to be also in other respects closely related.

Labial palpi black. Tongue whitish. Face and head black, with bluish and greenish sheen. Antennæ dark blue above, blackish below. Thorax and primaries dark with, in certain lights, a rather strong violet sheen, in others rather dusky, appearing unicolorous or hardly with a slight trace of a lighter transverse band at the end of the basal third and with blackish cilia. Secondaries as the cilia of the primaries, at the base slightly transparent, the veins also in the middle a little darker than the wing. Underside of both wings dusky, unicolorous grey-brownish black, the distal half of the cilia slightly lighter. Legs as the thorax, the violet sheen partly rather strong. Abdomen like that of the following species.

3. *Trichostibas fonteboæ* Strand sp. n.

1 ♂ from Fonteboa, Upper Amazonas (*Hahnel* leg.). Cocoon, *vide supra*.

From *Tr. sanctipaulensis* m. this species differs by a distinct, dirty greyish-white, transverse (a little obliquely directed) band at the end of the basal third of the primaries; this band is 1·8 mm. broad and about 1 mm. distant from both the costal and the dorsal edge, almost straight and parallel-sided and about 2·5 mm. (in the dorsal area) to 4 mm. (in the costal area) distant from the base. At the end of the second third is an indistinct, horseshoe-shaped, greyish-white, transverse figure, the convexity of which is directed towards the margin and the anterior end is somewhat dilated; sometimes perhaps this figure is divided into three spots. The underside of the primaries and the ground-colour of the secondaries as well as the cilia of both

wings are as in *Tr. sanctipaulensis*, but the secondaries are in the basal two-thirds strongly transparent and accordingly greyish white appearing, with hardly darker veins. The hair pencil of the base of the costa of the secondaries long and snow-white. The underside of the secondaries only in the basal and dorsal area a little lighter than the primaries. Abdomen anteriorly more greyish than the thorax, posteriorly as this or with a stronger greenish sheen. Anal tuft distinct. Hind tibia thickly covered with long hairs. Alar expanse 29 mm.; length of the primaries 13, of the body 12·5 mm.

That this form is not the other sex of the previous species (*Tr. sanctipaulensis* m.) is evident from, among others, the fact, that the cocoons are different (*vide supra*).

4. *Trichostibas distincta* Strand sp. n.

1 ♂ from Chiriqui, Vulkan, 1892 (*Trötsch* leg.).

Belongs to the spotted group of the species and is easily distinguished. Primaries olivaceous brown, with light, unusually distinct spots, which are so large as to fill up at least half of the wing, light greyish white, sharply marked, and form the following figures: in the basal half a transverse band consisting of four longish spots, only indistinctly separated by the veins, of which the posterior touches the dorsal edge and is about three times as long as broad, the following is hardly half as long as the posterior, the next following is about two-thirds as long as the posterior, while the anterior is the smallest of the four and does not touch the costal edge. The area of the outer margin, as well as the cilia, covered with a band of the same light colour, which is 2–3 mm. broad and posteriorly and submedially indistinctly unites with a large, roundish, but rather irregular spot, which fills up almost the whole median area from the costal edge to the fold, and looks like an irregular annuliform figure, including a triangular spot, or as if formed by six to seven spots, partly joining. Underside of the primaries greyish brown, along the outer margin somewhat lighter, in the dorsal area with a yellowish-whitish spot, and before this with some violet sheen. Secondaries transparent, with blackish-brown cilia and veins, the costal area and a line on the outer margin opaque, blackish brown; of the hair pencil of the costal edge only a few greyish-white hairs are to be seen. The body is much worn, but appears, as well as the appendages, to be dark brown or blackish; thorax above partly or wholly greyish white.

Alar expanse 27 mm.; length of the wing 12·5, of the body 10 mm.